

DISCOURSE AWARENESS AND ISSUES IN EST MATERIALS DESIGN

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Abstract

Understanding text structure (knowledge of discourse and genre) within specific contexts plays a very important part in EST materials development for language teaching and learning. It is argued that for students to comprehend particular texts and to learn a language well, language teaching should begin with an understanding of text structure. It is thus essential for EST teachers to be aware that linguistic patterns exist across stretches of text within different text types and an understanding of these patterns would make text comprehension and reading to learn in the content area easier. Thus, teachers need to be trained to develop discourse-based materials as an understanding of different text types can enhance language learning. This paper discusses the importance of discourse awareness and issues of design, development and application in the development of EST materials in relation to written texts by introducing frameworks for designing discourse-based materials.

Keywords: discourse awareness, EST materials design

INTRODUCTION

Materials play a very important role in the field of English for Specific Purposes (ESP). Yet, in the context of English for Science and Technology (EST) there appears to be a lack of research and attention to how teachers interpret, design, develop and use materials in the EST classroom. In the context of EST, the materials used for language teaching are usually content-based materials from the different science and technology disciplines. These materials, written for a specific audience using different genres, registers, styles and specialized vocabulary, are framed differently from English for General Purpose (EGP) materials. Thus, the content-based materials taken from the different science and technology disciplines pose a challenge for the EGP teachers who have to teach EST

and have little or no training in ESP material design, development and application. It would thus be pertinent that EST teachers are trained to understand the features of EST materials to help guide their students in understanding science and technology materials in English. This paper aims to provide and discuss practical aspects of how knowledge of discourse can be used as an organizing framework for developing EST teaching materials using content specific materials and how such knowledge and understanding can empower students learning.

DEFINITION OF ESP

ESP is generally defined as a language teaching area requiring careful research and design of pedagogical materials and activities for an identifiable group of learners within a specific learning context (Johns and Dudley-Evans, 1998:298). ESP teaching should be linked to a specific discipline, make use of methodology that differs from that used in English for General Purposes teaching. Johns and Dudley-Evans point out that it is essential that an ESP course take into consideration register, genres and associated language that students need to understand and to manipulate in order to carry out activities related to their disciplines. As such, this would mean that within the context of EST, the EST practitioners have to ensure that the materials used in the teaching of EST highlight aspects of register, genres and associated language of the discipline specific materials. This involves exposing EST instructors and students to awareness of discourse (text structure) and genre of the different text types used in EST teaching. Based on the above definitions it is clear that a number of aspects need to be considered when working within the context of ESP/EST.

ENGLISH FOR SCIENCE AND TECHNOLOGY (EST)

English for Science and Technology English for Academic Purpose (EST) is a branch of EAP as illustrated in Figure 1.

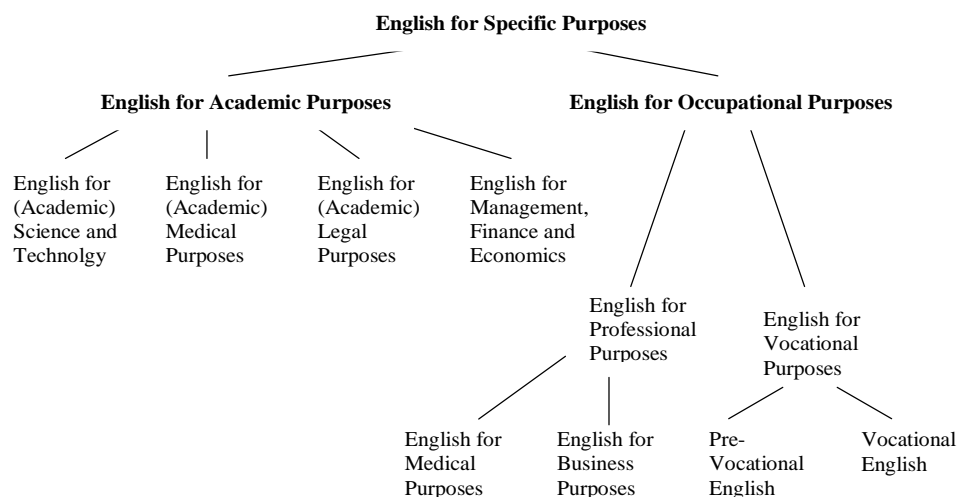


Figure 1 Johns and Dudley-Evans (1998: 6)

If we study the context for EST within the umbrella of EAP, we will notice two things. That is, do we take a common core approach for EAP, or do we take a more discipline specific approach where specific attention is given to particular language features of the discipline?

In EST, the materials used for language teaching are that of authentic materials from the different science and technology disciplines. These materials are written for a specific audience using different registers, styles and specialized lexis. In other words, they are framed differently from EGP materials. Thus, the materials taken from the different science and technology disciplines will be a challenge for the novice EST instructor who has to teach EST and has little or no training in ESP materials design, development and application. The challenge therefore lies in the understanding of the features of EST materials and pedagogy. At the same time, there is a need to guide students in understanding science and technology materials in English.

I strongly believe that EST practitioners should be made aware of the discourse or genre approach to materials design because an understanding of different text types can enhance language learning and improve knowledge of written discourse. Further, I believe that for students to comprehend particular texts and to learn a language **well**, EST teaching should begin with an understanding of text structure. It is essential for teachers to learn to develop discourse-based materials to enable them to become aware that linguistic patterns exist across stretches of text within different genres or text types. They also need to realize that an understanding of these linguistic patterns would make text comprehension, writing, listening and speaking easier (Rafik-Galea & Jasvir Kaur, 2004; Rafik-Galea, 2004a, 2004b). It is thus necessary to look at some of the

issues surrounding ESP materials design and development before moving on to discourse frameworks for the design and development of discourse-based materials.

ISSUES IN DESIGN AND DEVELOPMENT OF EST MATERIALS

Designing materials must begin with a needs analysis in the context of ESP. Both students' needs and the teachers needs have to be considered. Identify skills and knowledge needed based on a needs analysis. Sit in a science and technology class and watch what takes place. One will notice that it is not quite what the language teacher thinks it should be.

I would like to suggest that in the design and development of EST materials, materials writers take the approach suggested by Dudley-Evans and St. John (1998) and Bernard Mohan (1986) and the adapted version of the Davies and Green (1984) DARTS model modified by Cortazzi & Jin, Rafik-Galea (1998); that is, the use of carrier content and real content in the designing and teaching of ESP/EST materials.

The notion of carrier content and real content according to Dudley-Evans and St. John (1998:11-12) "are essential to the understanding of ESP work and to the understanding of motivation in ESP." To illustrate this let us say that you have identified a text on a description of a process in EST. The text is a descriptive text and it describes an object or an instrument or a process of combustion. As a teacher, you are interested in teaching the students how the text is structured and you discover the following macro structure.

The analysis revealed that the text:

- Usually begins by giving an outline statement (often a definition statement)
- Discusses important points and builds up the information in detail. The information is presented in some order. You also begin to notice that the order in which the details are built up is also important. First, it introduces simple information and gradually moves on to more complex information; or begins with the familiar and moves on to the unfamiliar or starts off with fundamental points and goes on to less vital ones.

The lesson on the notion of scientific organization of information of the description of process is the 'carrier content' as it has all the 'ingredients' of an authentic material/topic and can be used as a vehicle of the 'real content'—the teaching of the language of scientific description. Thus, the text type chosen should not be a watered down (simplified) text.

The design of the materials must take into account what the students really have to do in the science and technology environment. In short, an analysis of the language features of EST writing is needed (Rafik-Galea, 2004a, 2004b).

It is also important for EST teachers to select materials that can be fully exploited. The EST teacher should place importance on the text type selected. The following are some suggestions that the EST teacher may consider.

- Select the materials that are central to the core objective.
- Select the activities that are central to the core objective. Ensure that some of the activities involve analysis of information.
- Focus materials and activities must focus on real content.
- Match carrier content to real content. Work with a content teacher. Provide 'real' activities.
- Use a variety of text types. Make students aware of the different genres. Texts should represent real content and should be graded from simple to difficult.

In developing the EST materials care must be given to drawing students' attention to the nature of the information in the text. How is it structured? Provide activities that show students how information can be visually/graphically presented. To illustrate this there is a need to understand the discourse/genre knowledge frameworks.

KNOWLEDGE OF DISCOURSE/GENRE

The term discourse can be defined in many different ways. It involves looking at both language form and language function and includes the study of **both spoken interaction** and written texts. It is concerned with the study of the relationship between language and the contexts in which it is used. Thus, an understanding of discourse analysis helps in identifying linguistic features that characterize different genres as well as social and cultural factors that aid or guide one's understanding of different text types and types of talk. Discourse analysis can be defined as "the study of the language of communication—spoken or written" (Hatch, 1992:1). Discourse analysis is often linked to genre analysis. Both involve the study of text

structure. Such studies play a very important role in designing discourse-based materials.

Unlike discourse analysis, genre in many ways still remains a fuzzy concept in the field of language learning (Swales, 1990:33; Reid, 1997). Yet, it seems crucial that classroom practitioners should understand the notion of genre, even though, as Kay (1994:63) points out that understanding the notion of genre is no simple task.

What is important here is that teachers and students need to learn to identify and to become familiar with knowledge of those text types that are necessary. Typical text types can be identified as report, exposition, explanation, debate, and manuals, etc.

Knowledge of discourse/genre can be developed through the use of a variety of discourse/genre frameworks to help students develop a sense of knowledge of text structure (Hoey, 1983; Mohan, 1986, Callaghan *et al.*, 1993, McCarthy and Carter, 1994; Cortazzi and Jin, 1996; Rafik Khan, 1997; Cortazzi, Rafik-Galea and Jin, 1998; Rafik-Galea & Jasvir Kaur, 2004). Knowledge of text structure pattern is critical for learning to read, learning to write, and spoken communication and in listening for specific information. It is a prerequisite for language competency across the four skills and across disciplines. Awareness of discourse/genre knowledge provides an understanding of the structure found in a variety of text types. This will lead to a better understanding of information in written texts.

It is argued that knowledge of text structure is a prerequisite to conscious control of reading, writing and learning strategies (Rafik Khan, 1997; Cortazzi, Rafik-Galea and Jin, 1998). Teachers need to instruct students to use text structure to enhance learning of a language across the four skills. Teachers can easily teach student's clause-relation patterns found in texts in order to show text relations and rhetorical functions (Hoey, 1984; Rafik Khan, 1997; Cortazzi, Rafik-Galea and Jin, 1998). When discourse/genre knowledge frameworks are combined with the use of graphics, the language learning process becomes more meaningful. At the same time understanding of content becomes easier and clearer for the learners. Hence, in designing discourse-based materials for the ESP classroom, knowledge of types of graphic organizers also plays an important role.

In designing discourse-based materials and in reading expository texts, the function of illustrations and graphics are vital in complementing texts to assist learners to understand practical experience and to aid abstract thinking. A good graphic has the power to enhance reading, shows meaning and helps in drawing conclusions. It also enhances and develops the understanding of concepts (Rafik Khan, 1997). In addition, it helps in the understanding of text structure.

For example, demonstration of results, explanation of processes, functions, procedures, and cause effect relationships can easily be presented in tabular form by teachers or learners themselves. In this way both teachers and students show understanding of not only content but also of their perception of the coherence of a text (Cortazzi, Rafik-Galea and Jin, 1998). In addition, this will enable students to show their ability in reconstructing knowledge and understanding. Practice and guidance in using graphic organizers in developing discourse knowledge ultimately enables the learners to extract meaning and to show understanding when they have found significant relationships in the text. The incorporation of graphics in designing discourse-based materials for ESP provides support in communicating the structure of knowledge and text discourse and allows teachers or students to develop in-depth questions alongside graphics (Mohan, 1986:87). Mohan maintains that various types of graphics develop not only learners' knowledge but also specific thinking processes related to particular knowledge structures.

In ESP teacher education, the need to find ways to develop graphics in order to help in the process of understanding the discourse of text types is considered very important. In multidisciplinary fields the ability to read, to comprehend and to develop graphics is crucial for developing discourse, text understanding and thinking.

KNOWLEDGE / DISCOURSE FRAMEWORKS

Discourse/genre knowledge can be developed through the use of a variety of discourse/genre frameworks to help students develop a sense of knowledge of text structure (Hoey, 1984; Mohan, 1986; Callaghan *et al.*, 1993; McCarthy and Carter, 1994; Cortazzi and Jin, 1996; Rafik Khan, 1997; Cortazzi, Rafik-Galea and Jin, 1998). Knowledge of text structure pattern is critical for learning read, learning to write, and in listening for specific information. It is a prerequisite for language competency across disciplines. Recognizing knowledge structure promotes better understanding of text information.

It is argued that knowledge of text structures is a prerequisite to conscious control of reading (particularly reading to learn), writing and learning strategies (Rafik Khan, 1997). ESP teachers need to instruct students to develop an understanding of text structure in order to enhance learning of a language across the four skills. Teachers can easily teach students clause-relation patterns found in texts in order to show text relations and rhetorical functions (Hoey, 1984; Rafik Khan, 1997; Cortazzi, Rafik-Galea and Jin, 1998) which leads to understanding how information in different text types are structured. When discourse/genre knowledge

frameworks are combined with the use of graphics, the language learning process becomes more meaningful. At the same time understanding of content becomes easier and clearer for the learners.

Discourse knowledge can be developed through the use of a variety of discourse frameworks to help students develop a sense of knowledge of text structure (Hoey, 1984). In this paper only two types of discourse frameworks are discussed. They are an adapted version of the Directed Activities related to text (DARTS) model from Lunzer and Gardner (1984), Davies and Green (1984), Rafik Khan (1997) as illustrated in Figure 2 and Mohan's (1986) Knowledge Framework as illustrated in Figure 3.

The adapted DARTS model consists of a structural classification of text and its component constituents. This approach was developed in Britain with teachers for reading in the sciences and is known as DARTS. Its approach provides practical ways to help ESP teachers assist students with reading texts across disciplines, and I have found it to be extremely useful in the EST context. The adapted version of the DARTS is known as the Discourse Framework of a Structural Classification of Text Types as illustrated in Figure 2.

MOHAN'S KNOWLEDGE FRAMEWORK

Mohan's (1986) knowledge framework is a Canadian model and was also developed with teachers. Although the emphasis is on ESL across the curriculum mainly in the area of language and content, this model works very well in the EST context. The model links language skills with knowledge and thinking through the use of key visuals and understanding of discourse for not only curriculum planning but also for discourse-based task and materials development. It is very useful for developing a knowledge framework for classifying teaching-learning activities. According to Mohan's framework, an activity can be divided into six major types of knowledge structure: classification, description, principles, sequence, evaluation, and choice. Semantically, the knowledge framework looks like Figure 3. What this framework establishes is that we need both the theoretical and practical knowledge to carry out an activity or complete a task. Based on Figure 3, the upper level of the framework can be applied to learn and express theoretical knowledge and the lower level can be applied to learn and carry out the practical aspect of knowledge. In using this model for developing tasks/materials the language instructor can train the learners to link discourse knowledge, language skills, thinking skills and graphic organizers interactively. This model allows EST practitioners to design intellectual and cognitively challenging materials for their learners as illustrated in Figure 4, which is based on Sample Text 1 "The Lavender Plant".

THEORETICAL		
<i>Classification</i>	<i>Principles</i>	<i>Evaluation</i>
PRACTICAL		
<i>Description</i>	<i>Sequence</i>	<i>Choice</i>

Figure 3 Mohan's Knowledge Framework (1986)

Figure 4, demonstrates how the knowledge framework can be applied to develop discourse-based materials and the kind of knowledge both the EST teacher and learners need to know or understand. Beginning with the upper level, the classification structure is useful for defining, developing and applying new concepts. The principle structure is useful for interpreting, explaining and predicting data and drawing conclusions. The

evaluation structure is useful for teaching how to make judgments and evaluations, and express personal opinions. The description structure is useful for teaching how to describe events such as a science experiment. The sequence structure is useful for teaching order of information and events. The knowledge framework is very good for identifying and teaching thinking skills including language which incorporates analysis of linguistic features needed for carrying out activities within a certain text type involving specific knowledge.

APPLICATION OF THE DISCOURSE KNOWLEDGE FRAMEWORKS FOR DESIGNING EST MATERIALS

How can the frameworks be used? The frameworks in Figures 1 and 2 provide a simple explanation of how information in a text can be explained in terms of graphics and discourse/genre knowledge. I provide an example to illustrate how they can be used. Additional examples are provided in Appendix 1.

Developing Discourse-Based Materials/Tasks

In order to aid the process of learning to comprehend a certain text structure, it is crucial to design, select and develop suitable materials for EST language teaching and learning. While it is undeniable that linguistic patterns exist in text within different genres, it is therefore important that EST teachers are trained to understand these patterns, which aid comprehension of a text and thus provide an awareness of how discourse knowledge helps in designing appropriate materials for the EST classroom.

Example 1

Understanding Text Structure

Sample text 1 is of a particular genre and consists of a set type of text structure. The information is semi technical in nature (Rafik-Galea & Jasvir Kaur, 2004: 153). Based on the understanding of the text, both the EST teacher and students can now fill in the information in the discourse framework of a structural classification of text type. The teacher can design this as an interesting activity in analyzing texts from specific disciplines. An additional column may also be added to include a linguistic analysis of the language or grammar used. In addition, the teacher can exploit the same text further by using Mohan's knowledge framework as illustrated in Figure 4 and as exemplified by the example of Task 'B'.

Sample Text 1

The lavender plant is an aromatic shrub (genus Lavandula) of the mint family. The colour of flower is a pale lilac. The lavender oil is a characteristic of the old world spike lavender and is the source of the oil of lavender. This oil is mainly used to produce perfume. The dried flowers and leaves of this plant are used to scent linen, cupboards and

homes. (The New International Webster's Comprehensive Dictionary of the English Language, 1996).

Example of Task 'A' from Sample Text 1: Filling in the Discourse Framework of a Structural Classification of Text Type.

Text Type	Slots / Information Constituents	Discourse Knowledge	Thinking Skills/ Process	Types of Information
Factual Descriptive	Definition + characteristic/features + parts +function	Definition Description Exemplify	Defining + Describing Labelling Describing + Explaining	E.g. The lavender plant is..... The colour of the plant is..... The lavender oil is a...mainly used to produce perfume.....

The EST teacher needs to understand that he/she needs to do a thorough analysis of any subject discipline texts selected for its written discourse and linguistic features before designing tasks based on the frameworks. A good sound knowledge of the different types of graphics available to match the different discourse type or knowledge structures is crucial. Figure 4 also provides an example (sample task B) of how the EST teacher can create activities based on the short text on "The Lavender Plant". Appendix 1A and B provides a clear illustration of EST tasks designed along the lines of the discourse/knowledge frameworks.

Identifying Text Structure Through Information Type

Alternatively, teachers may use the following guidelines provided in figure 5 to identify the information constituent of the text as a guide to brainstorm the texts with the students before using the structural classification of text type framework or Mohan's knowledge framework.

In order to direct students to identify text structure, the teacher can first help the students to ask questions based on Jordan (1984). The questions should be directed at the information constituents in the text. Some of the types of questions that can be structured are as follows:

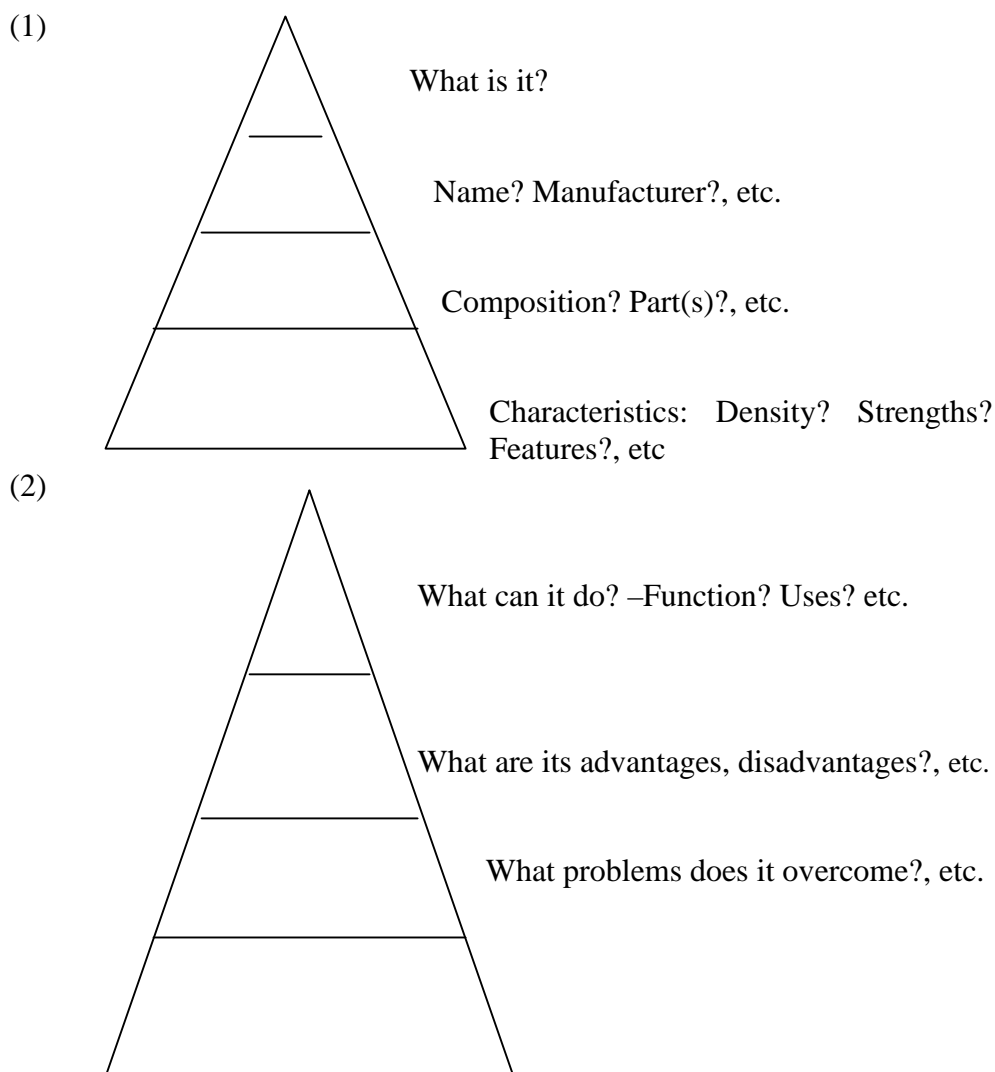


Figure 5 Identifying Information Constituents (Jordan, 1984).

As illustrated in Figure 5, the question type used for directing students to identify information constituents in developing discourse awareness is varied but concise. The sequence may take the following form (Rafik-Galea & Jasvir Kaur, 2004: 155-156):

Examples of question type:

1. What is the information in the text doing?
2. How is the information in the text structured?

Does it:

- define? : What kind of definition?: Does the definition describe, exemplify, illustrate? etc.
- describe? : How is the description done? Does it consist of examples, parts, functions, features, labels? etc.
- explain? : How is the explanation done? Through cause-effect relationship, description, exemplification ? etc.
- compare/contrast? : In what way is this done? Does it consist of description, categorizations, exemplification? etc.
- classify/categorize? : How and in what way? Is the information ordered in some form of sequence? Does it describe, compare, label or provide examples? etc.

Directing students to identify information constituents in a text through good questioning techniques empowers students to learn about clause relations, linguistic features and the sequence in which information is structured. This also helps them to develop thinking skills.

Research (Mohan, 1986; Cortazzi and Jin, 1996; Mohan & Van Naerseen, 1997; Tang, 1997; Rafik Khan, 1997; Cortazzi, Rafik-Galea & Jin, 1998; Mohan & Beckett, 2001; Rafik-Galea & Jasvir Kaur, 2004) in designing discourse-based materials using the discourse and knowledge frameworks have shown that when these frameworks are used effectively by teachers in their language classrooms, their teaching learning environment improves tremendously. Rafik Khan's (1997) and Cortazzi, Rafik-Galea and Jin's (1998) study showed that when teachers are trained to use the frameworks for designing tasks/materials in the EST context, the teachers showed significant improvements in the way they think and their materials were more cognitively challenging and interesting. These frameworks can also be applied in regular ESL or EFL classrooms.

CONCLUSION

This paper has highlighted through a number of examples how EST practitioners/teachers can structure their lessons by designing discourse-based materials that take into consideration the understanding of knowledge of text structure and the linguistic features within each different text type/genre.

The same principles will apply for the teaching of summary writing, listening skills, speaking skills and writing. The paper has demonstrated that this type of materials develop thinking skills and is also useful for developing diagrams or graphics.

The development of teaching materials should include activities to introduce the knowledge of how a text is structured or organized to enhance language learning among English as a second language learners. Most importantly, I have stressed that it is essential for language teachers to be exposed and trained to a discourse/genre approach to EST materials design because a grasp of the different types of text structures can enhance language learning besides enhancing learning in general.

Finally, other educational implications of discourse-based materials are that once students learn to identify the discourse of different text types, learning and understanding the language becomes easier. In addition, it empowers the students to develop the ability to transfer or apply concepts to real-life problems related to discipline specific materials, develop better understanding of content knowledge as well as critical and creative thinking skills.

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Text Type	Slots / Information Constituents	Discourse Knowledge	Thinking Skills/ Process
Physical Structure (Description)	Part - Location+Property + Function + characteristics	Description	Observing, labelling, describing,
<i>Process</i>	State or form of object or phenomenon- Time or stage , location+ instrument or agent of change + property + transformation, action or reaction	Description Sequencing / Chronological Cause-effect	Describing, ranking Explaining, labelling, Developing rules, methods
Classification / Categorization	Property or Feature or Thing → example + group + comparison + test of property feature + definition system/dimensions of classification	Definition + Expanded Definition Description Exemplification Comparison-contrast	Classifying, defining, Using operational definitions, describing, judging etc.
Instruction	Step or Procedure → Materials + Apparatus or Measure + caution or Condition + Result + Interpretation	Description Sequencing / Chronological Exemplification Cause-effect	Describing, ranking Explaining, illustrating, labelling, developing rules, methods
System Production	Producer or Production System → Product + Location + Requirement + Distribution	Description Exemplification Sequencing Evaluation	Observing, labelling, describing, explaining, developing rules, methods, judging

Figure 2 Example of a Discourse Framework of a Structural Classification of Text Types (based on DARTS Model (Adapted and Modified from: Lunzer & Gardner 1984, Davies and Greene 1984, Rafik Khan 1997)

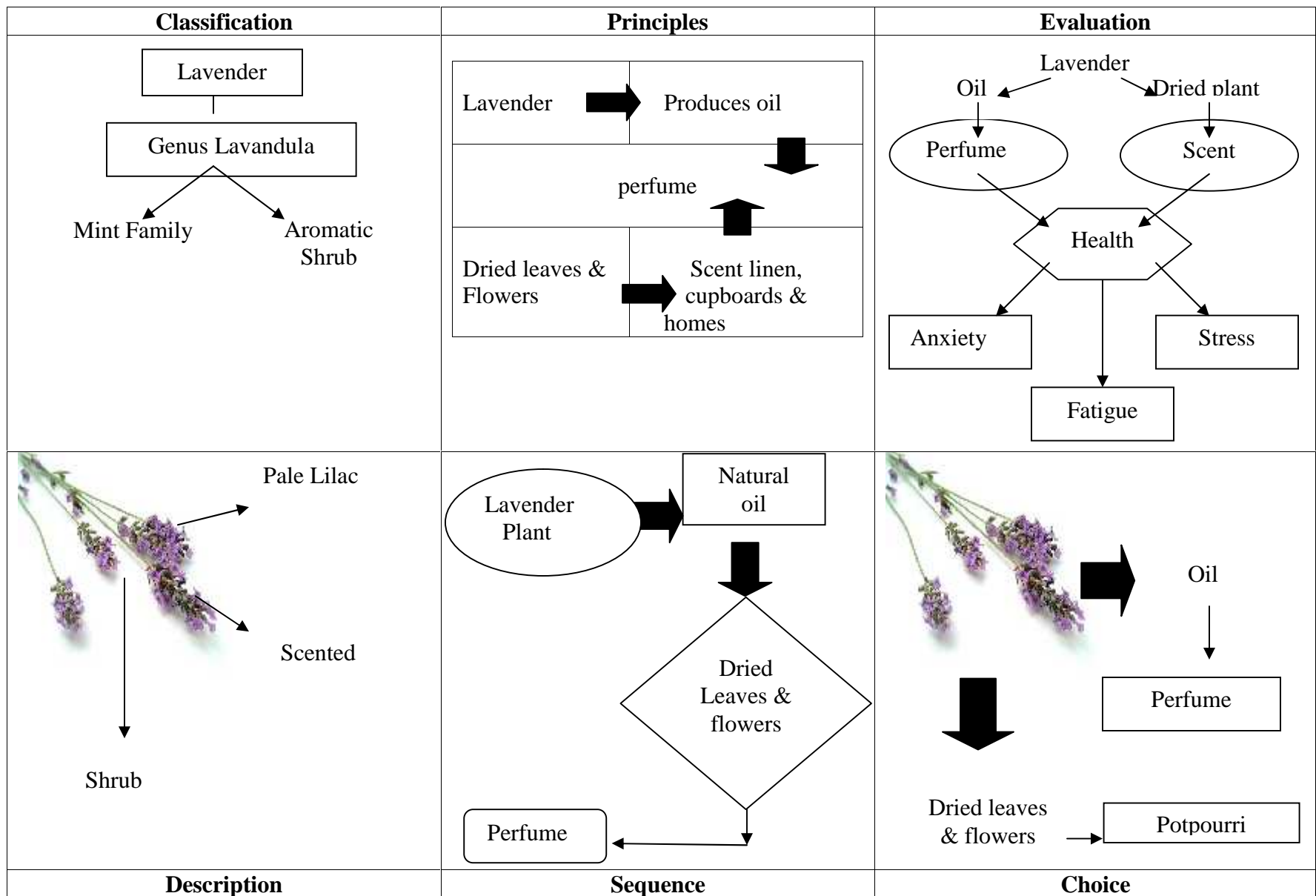


Figure 4 Sample task ‘B’ based on Mohan’s (1986) Knowledge Framework

A Pressure Cooker

A pressure cooker is an airtight container which **cooks food (F)** (by means of **pressurized(F)** **steam (F)** in much less than the usual time. It does this by **raising the boiling point of water(F)**.

A **pressure cooker (O)** takes the form of a strong **metal container(O)**, with a **lid which has (C) rubber sealing ring (O)**. **Steam only escapes through a (C) pin valve (O)**, which can be set to blow at varying excess pressures. As a result, it is **possible to cook at high pressures (F)** and at temperatures up to 120°C or even more, and this **saves both time and fuel (F)**.

Principle(P)

Objects (O)

Characteristics (C)

Functions (F)

